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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/692,007 10/19/00 DEORNELLAS

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EXAMINER

UMEZ ERONINI, L

ART UNIT

PAPER NUMBER

1765

DATE MAILED:

02/14/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
09/692,007

Applicant(s)  
DeOrnellas et al.

Examiner  
Lynette T. Umez-Eronini

Group Art Unit  
1765



☐ Responsive to communication(s) filed on \_\_\_\_\_

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-41 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-9, 11-21, 23-33, and 35-41 is/are rejected.

☒ Claim(s) 10, 22, and 34 is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☒ The proposed drawing correction, filed on Oct 19, 2000 is ☒ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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## DETAILED ACTION

### *Priority*

1. It is noted that this application appears to claim subject matter disclosed in prior copending Application No. 09/009369, filed 1/20/1998. A reference to the prior application must be inserted as the first sentence of the specification of this application if applicant intends to rely on the filing date of the prior application under 35 U.S.C. 119(e) or 120. See 37 CFR 1.78(a). Also, the current status of all nonprovisional parent applications referenced should be included.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

In claim 1,

lines 1 and 2, "minimizing critical dimension growth of the width of features" is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized;

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line 7, "to minimize critical dimension growth of features . . ." is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized.

lines 1 and 7, "critical dimension growth" is unclear in its meaning; and

lines 2 and 7, "features" is unclear in its meaning.

In claim **13**,

lines 1 and 2, "minimizing critical dimension growth of the width of features" is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized;

lines 7 and 8, "to minimize critical dimension growth of the width features . . ." is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized.

lines 1 and 7, "critical dimension growth" is unclear in its meaning; and

lines 2 and 8, "features" is unclear in its meaning.

In claim **25**,

lines 1 and 2, "minimizing critical dimension growth of the width of features" is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized;

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line 9, "to minimize critical dimension growth of the features . . ." is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized.

lines 1 and 9, "critical dimension growth" is unclear in its meaning; and

lines 2 and 9, "features" is unclear in its meaning.

In claim 26,

lines 1 and 2, "minimizing critical dimension growth of the width of features" is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized;

line 8, "to minimize critical dimension growth of the width features . . ." is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized.

lines 1 and 8, "critical dimension growth" is unclear in its meaning; and

lines 2 and 8, "features" is unclear in its meaning.

In claim 28,

lines 1 and 2, "minimizing critical dimension growth of the width of features" is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized;

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lines 7 and 8, "to minimize critical dimension growth of the features . . ." is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of the features is minimized.

lines 1 and 7, "critical dimension growth" is unclear in its meaning; and

lines 2 and 8, "features" is unclear in its meaning.

In claim 29,

lines 1 and 2, "minimizing critical dimension growth of the width of features" is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized;

line 8, "to minimize critical dimension growth of the features . . ." is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of the features is minimized.

lines 1 and 8, "critical dimension growth" is unclear in its meaning; and

lines 2 and 8, "features" is unclear in its meaning.

In claim 30,

lines 1 and 2, "minimizing critical dimension growth of the width of features" is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized;

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line 9, "to minimize critical dimension growth of the features . . ." is indefinite for failing to limit the scope of the process and to specify the extent to which the critical dimension growth of width features is minimized.

lines 1 and 9, "critical dimension growth" is unclear in its meaning; and

lines 2 and 9, "features" is unclear in its meaning.

### ***Claim Rejections - 35 USC § 102/103***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1, 6, 9, and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yoo (US 5,670,423).

Yoo teaches a method of controlling the critical dimension width of polysilicon (column 1, lines 1 and 2). The method comprises sputtering a titanium or

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titanium nitride (reactive metal) hard semiconductor mask **34B** directly overlying a polysilicon or polycide layer **16** and overlying a semiconductor substrate **10** (column 1, lines 29-37 and Figure **5A**); etching the hard mask layer **34** and polysilicon layer **16** that are not covered by the photoresist mask **36**, wherein the titanium hard mask **34** is wet or plasma etched (column 1, lines 50-55). Plasma etching the hard mask that lie over a semiconductor substrate suggests etching is carried out in a chamber, which reads on processing the work piece in a reactor using an etch step.

Using the same steps of Yoo as those of the claimed invention would inherently result in a method for minimizing critical dimension growth of the width features located on a work piece.

***Claim Rejections - 35 USC § 103***

6. Claims 3, 8, 11, 12, 16, 17, 19, 20, 21, 23, 24, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoo (US 5,670,423) as applied to Claims 1, 13, and 30 above.

Yoo differs in failing to teach exposing the hard mask to a stream of oxidizing gas in claims **3, 8, 16, 17, 20, and 32**.

It is well known in the art to etch Ti and TiN with a carbon and fluorine gas, such as CF<sub>4</sub>, which is an oxidant.



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It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Yoo by using a conventional plasma such as fluorine to etch as well as oxidize the hard mask for the purpose of obtaining the best etched product.

Yoo differs in failing to specify processing parameters as recited in **claims 11 and 23.**

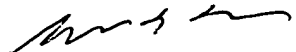
It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to employ any of a variety of temperature variables including those claimed by the applicant. This is a well-known variable in the etching art, which is known to affect both the rate and quality of the etching process. The selection of a particular range of value would be optimized by conducting routine experimentation to obtain the best etched product.

***Allowable Subject Matter***

7. Claims 10, 22, and 34, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is (703) 306-9074.



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February 12, 2001